

PRELIMINARY Specifications

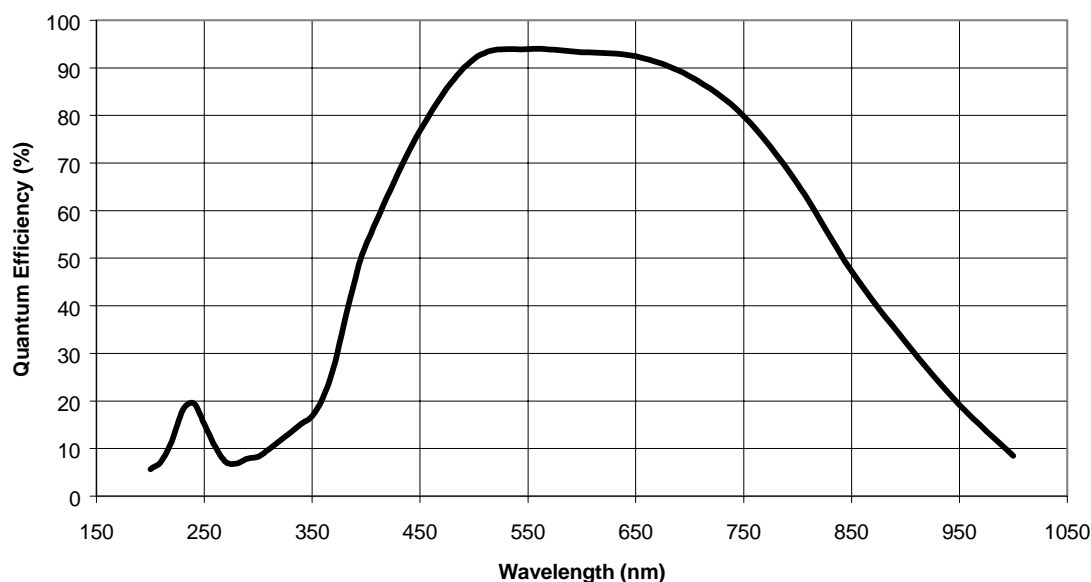
Andor's DW436, DW432N and DW436O cameras are designed primarily with scientific imaging in mind. The 2048 x 2048 array and 13 μm^2 pixels provide high resolution and dynamic range and the camera is equally effective for both low and high light imaging. It is ideally suited to biomedical imaging and astronomy applications. The system boasts negligible dark current with thermoelectric cooling down to -70°C and has excellent cooling capabilities in high ambient air conditions. The DW436N and DW436O models have an integrated shutter and lens attachment.

●Sensor	Active Pixels	2048 x 2048	Dummy Pixels ^{*1}	50, 50, 0, 0
	Pixel Size (μm^2)	13.5	Image Area (mm)	27.6 x 27.6
	Pixel Well Depth (e ⁻ , typical)	80,000	Register Well Depth (e ⁻ , typical) ^{*2}	600,000
	Linearity (% , maximum) ^{*3}	1	Gain (e ⁻ /count @ 1&2, 16, 32 μs)	2, 1.4, 0.7
	Vertical Clock Speed (μs)	112		

●Noise	System Readout Noise (e ⁻) ^{*4}	Typical	Maximum:
	31kHz pixel readout rate	3.5	5.5
	1MHz pixel readout rate	12	18

●Quantum Efficiency

Quantum Efficiency for BV (550nm) CCD's at -90°C



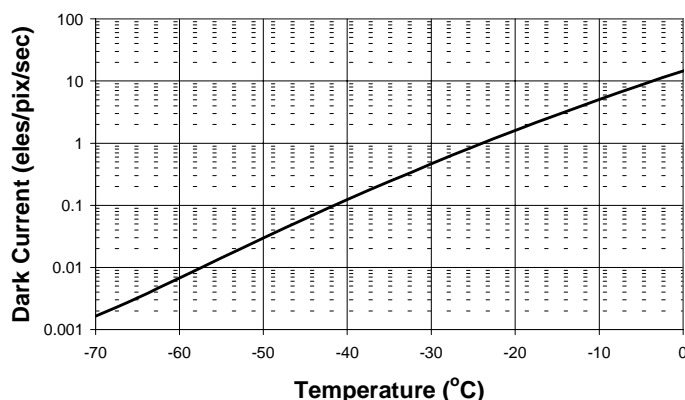
Peak Quantum Efficiency at room temperature [-90°C] (%)^{*5}

CCD Type	Minimum	Typical
BV @ 550 nm	85	95 [94]

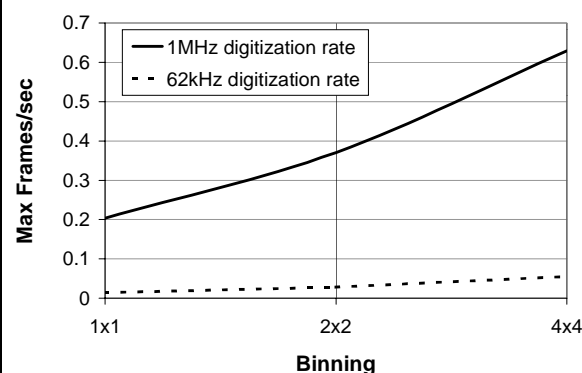
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● Features & Benefits	Peak QE of 95%	High detector sensitivity
	Min operating temp of -70°C with TE cooling	Negligible dark current without the aggravation or safety concerns associated with LN ₂
	Min operating temp of -55°C with 30 °C ambient air	Provides excellent cooling capability in high ambient air conditions
	Large area format	Excellent for applications such as DNA chip reading, microscopy and astronomy
	Guaranteed hermetic vacuum seal	Ultimate reliability and sustained lifetime performance characteristics
	Back-illuminated design	Offers the best price/performance options
	13.5 x 13.5µm pixel size	Optimised pixel size for dynamic range and high resolution
	Andor-MCD Software	Friendly Windows user interface offers system integration, automation and advanced data manipulation facilities

● Dark Current ♦6



● Max Frames per sec ♦7



● Temperature (°C)

	Computer Power Supply	External PSU PS155
Air-cooled		
(ambient air @ 20°C)	-25	-60
(ambient air @ 30°C)	-20	-55
Water-cooled		
(@ 10°C, 0.75l / min)	-30	-70

● Operating & Storage Conditions

operating temperature	0°C to 30°C ambient
relative humidity	< 70% (non-condensing)
storage temperature	-25°C to 55°C

● Computer Requirements

Minimum:	
Windows 95/98:	100MHz Pentium + 64Mbytes RAM
Windows NT/2000:	100MHz Pentium + 128Mbytes RAM

Also:

- PCI-compatible computer
- PCI slot must have bus master capability
- Available auxiliary internal power connector
- 32 Mbytes free hard disc

Recommended:
300MHz Pentium (or better) + 256 Mbytes RAM

● Power

Requirements (for kHz [MHz] operation)

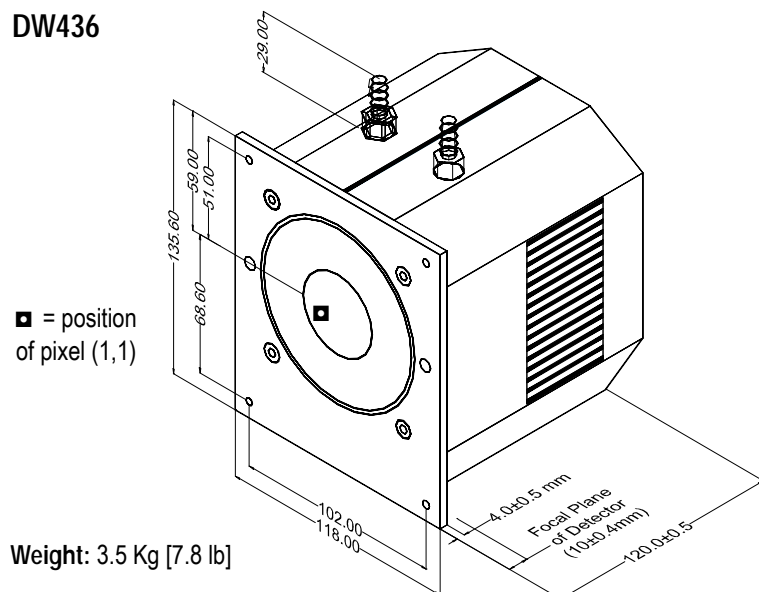
♦8

		No Auxiliary Cooling Connector		Auxiliary Cooling Connector	
No cooling	slot	2.4A	[3A]	2.4A	[3A]
	connector	-	-	-	-
TE cooler on	slot	1.5A	[1.5A]	0A	[0A]
	connector	-	-	2.2A	[2.2A]
Total		3.9A	[4.5A]	4.6A	[5.2A]

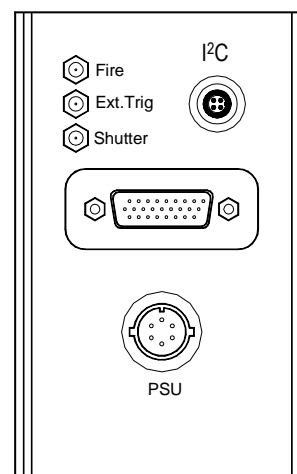
(Power drawn from +5V power supply; Optional external power supply (PS155) plugs into the mains.)

PRELIMINARY Specifications

DW436

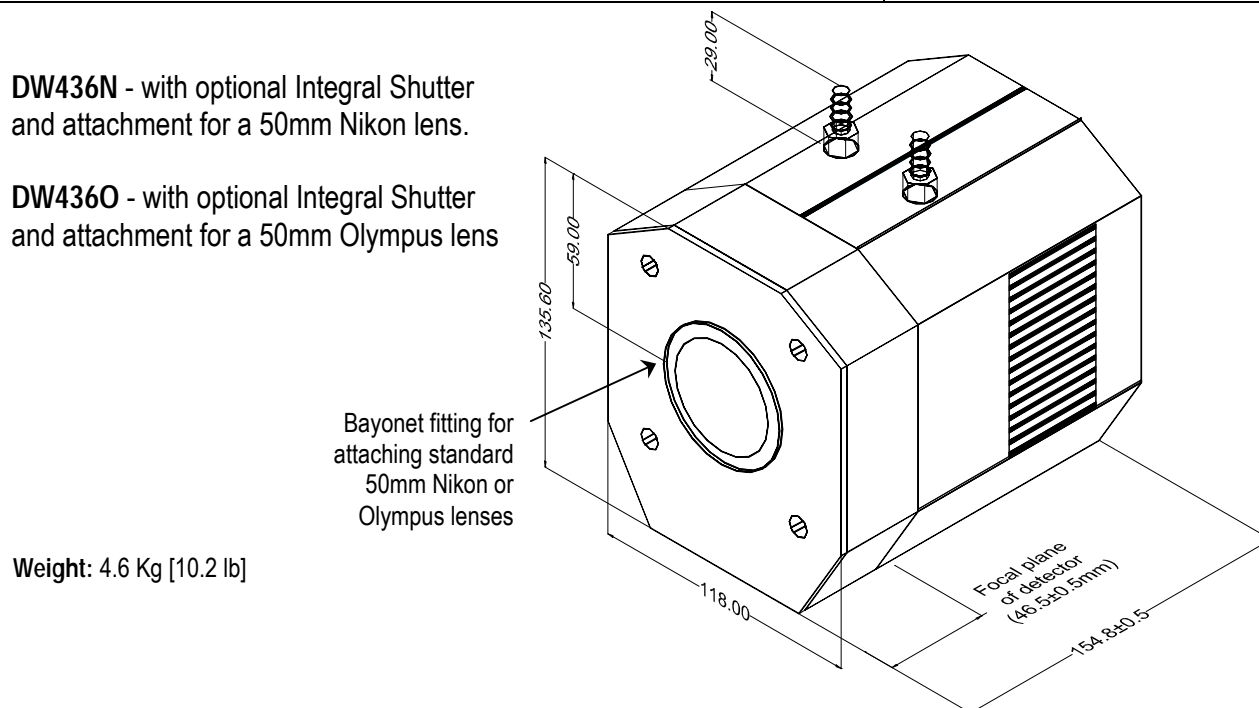


(all models)



DW436N - with optional Integral Shutter and attachment for a 50mm Nikon lens.

DW436O - with optional Integral Shutter and attachment for a 50mm Olympus lens



● For complete system use with...

The DW436/436N/436O requires one of the following controller card options

CCI-001 PCI Controller card with 16 bit 62KHz & 31KHz pixel readout rate options

CCI-010 PCI Controller card with 16 bit 1MHz, 500KHz, 62KHz & 31KHz pixel readout rate options

The DW436/436N/436O also requires one of the following software options.

Andor-MCD software – a ready-to-run Windows 95, 98, 2000, ME or NT -based package with rich functionality for data acquisition and manipulation

Andor-SDK-CCD – a DLL driver and software development kit that lets you create your own applications for the Andor camera

The DW436/436N/436O may be used with the following accessories

PS155 Power Supply Module for achieving the lowest temperatures

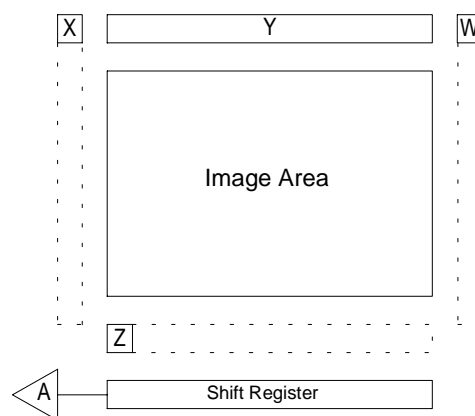
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- ◆ 1 Chip manufacturers may include a number of pixels or elements that are neither active nor part of the shift register. Andor refers to these pixels as dummy pixels and represents them in a 4-part notation (W, X, Y, Z), where:

W = dummy pixels to the right of the shift register (non-amplifier end)
 X = dummy pixels to the left of the shift register (amplifier end)
 Y = dummy pixels at the top of the image area
 Z = dummy pixels between the shift register and the image area.

A = position of output amplifier

It should be noted that the elements can be made up of either pixels, rows or columns.
 The diagram shows what is seen when looking at the front of the CCD.



- ◆ 2 The register well depth that is actually accessible by the CCD system is dependant on the gain setting.
- ◆ 3 Linearity is measured from a plot of Counts vs. Signal over the 16 bit dynamic range. Linearity is expressed as a percentage deviation from a straight line fit. This value is not measured on individual systems.
- ◆ 4 System Readout noise is for the entire system. It is a combination of CCD readout noise and A/D noise. Measurement is for Single Pixel readout with the CCD at a temperature of -50°C and minimum exposure time under dark conditions.
- ◆ 5 Quantum efficiency of the CCD sensor is measured by the CCD Manufacturer.
- ◆ 6 The graph shows typical dark current level as a function of temperature for back-illuminated CCDs. Systems are specified in terms of minimum dark current achievable rather than absolute temperature. The dark current measurement is averaged over the CCD area excluding any regions of blemishes.
- ◆ 7 The max frames / second for imaging CCDs is the maximum speed at which the device can acquire images in a standard system. The graph shows the frame rate for both 1MHz and 62kHz digitization rates for a range of binning combinations. It also assumes internal trigger mode of operation. Note that higher frame rates are achievable by using crop mode.
- ◆ 8 These power requirements are the maximum load that will be drawn from the computer for the camera head and controller card combined.

NOTE - These specifications are subject to change

Ordering Information:

To order any of these cameras quote part numbers:

DW436- with standard DW faceplate
DW436N- with integral shutter and a bayonet fitting for a 40mm Nikon lens
 or
DW436O- with integral shutter and a bayonet fitting for a 50mm Olympus lens

with the following CCD type option:
 [for example: **DW436O-BV**]

BV back-illuminated – AR coated for optimal performance in the visible region

Need more information? Contact us at:

US Office
Phone (860) 648-1085
Fax (860) 648-1088

International Office
Phone +44 28 9023 7126
Fax +44 28 9031 0792

Japanese Office
Phone +81 3 3511 0659
Fax +81 3 3239 8264